SOUTH PARK WATER AND SEWER (PWS 6060078)
SOURCE WATER ASSESSMENT FINAL REPORT

February 21, 2003

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment areas and sensitivity factors associated with the wells and the aquifer characteristics.

This report, *Source Water Assessment for South Park Water and Sewer, Bingham County, Idaho*, describes the public water system (PWS), the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The South Park Water and Sewer (PWS # 6060078) is a community drinking water system located in Bingham County in the center of the South Park Estates subdivision. The system consists of two wells that supply drinking water to approximately 150 persons through 28 connections. Both wells pump water directly to a 5000-gallon hydropneumatic steel pressure tank that then discharges water to the distribution system. The drinking water is not disinfected.

The wells are located in the same general area and therefore, share the same delineation. The potential contaminant sources within the wells' delineation capture zones include underground storage tank (UST) sites, aboveground storage tank (AST) sites, automobile repair shops, farms, contractor businesses, gravel pits, grain elevators, dairies, a deep injection well, sites regulated under the Superfund Amendments and Reauthorization Act (SARA), a wastewater land application (WLAP) site, Highway 26 and Highway 48, the Union Pacific Railroad, Little Sand Creek, Willow Creek, and sewer lines identified in the 1995 Ground Water Under Direct Influence (GWUDI) field survey. These sources can contribute inorganic chemical (IOC) contaminants, volatile organic chemical (VOC) contaminants, synthetic organic chemical (SOC) contaminants, or microbial contaminants to the aquifer system in the event of an accidental release or spill. Many of these sources can contribute leachable contaminants to the aquifer as well, adding to the overall vulnerability of the system.

Final well susceptibility scores are derived from equally weighting potential contaminant Inventory/land use, hydrologic sensitivity, and system construction scores. Therefore, a low rating in one category coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. Potential contaminants are divided into four categories: IOCs (e.g., nitrates), VOCs (e.g., petroleum products), SOCs (e.g., pesticides), and microbial contaminants (e.g., bacteria). As a well can be subject to various contamination settings, separate scores are given for each type of contaminant.

For the assessment, a review of laboratory tests was conducted using the State Drinking Water Information System (SDWIS). Coliform bacteria have been detected in the distribution system from 1994 to 1999. E-coli bacteria were detected in the distribution system on August 26, 1999. Since August 1999, there have been no detections of bacteria in the distribution system. No SOCs or VOCs have been detected in the drinking water. The IOCs barium, chromium, fluoride, and nitrate have been detected in the water samples but at concentrations below the maximum contaminant level (MCL) for each chemical, as established by the EPA. Alpha particles and beta particles (radionuclides) have been detected at minimal levels in the well water samples. Though IOC detections in the wells have been at low levels, the wells exist in a county with high nitrogen fertilizer use and high herbicide use. Additionally, the delineation of the wells crosses an SOC priority area for the pesticide atrazine. (An organic contaminant priority area is a region where greater than 25% of the wells in the area show levels greater than 1% of the primary standard or other health standards.)

In terms of total susceptibility, both wells rated high for IOCs, VOCs, SOCs, and microbial contaminants. Hydrologic sensitivity rated high for both wells and system construction rated high for Well #2 and moderate for Well #1. The potential contaminant inventory/land use for both wells rated high for IOCs, VOCs, and SOCs, and moderate for microbial contaminants. The predominant irrigated agricultural land use of the area contributed greatly to the high potential contaminant inventory/land use scores and to the overall susceptibility of the wells.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well or spring sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the South Park Water and Sewer system, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). If microbial contamination becomes a problem, the system may need to consider implementing a disinfection system. No potential contaminants should be stored or applied within a 50-foot radius of the wellheads. As land uses within most of the source water assessment area are outside the direct jurisdiction of South Park Water and Sewer, collaboration and partnerships with state and local agencies and industry groups should be established and are critical to success. Educating homeowners about source water will further assist the system in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include household hazardous waste disposal methods and the importance of water conservation. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Central Bingham Soil and Water

Conservation District, and the Natural Resource Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR SOUTH PARK WATER AND SEWER, BINGHAM COUNTY, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this assessment means.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are included. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is included.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water supply system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the public water system (PWS).**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The South Park Water and Sewer (PWS # 6060078) is a community drinking water system located in Bingham County in the center of the South Park Estates subdivision (see Figure 1). The system consists of two wells that supply drinking water to approximately 150 persons through 28 connections. Both wells pump water directly to a 5000-gallon hydropneumatic steel pressure tank that then discharges water to the distribution system. The drinking water is not disinfected.

Coliform bacteria have been detected in the distribution system from 1994 to 1999. E-coli bacteria were detected in the distribution system on August 26, 1999. Since August 1999, there have been no detections of bacteria in the distribution system. No synthetic organic chemicals (SOCs) or volatile organic chemicals (VOCs) have been detected in the well water. The inorganic chemicals (IOCs) barium, chromium, fluoride, and nitrate have been detected in the water samples but at concentrations below the maximum contaminant level (MCL) for each chemical, as established by the EPA. Alpha particles and beta particles (radionuclides) have been detected at minimal levels in the well water samples. Though the chemical detection in the wells has been at low levels, the wells exist in a county with high nitrogen fertilizer use and high herbicide use. Additionally, the delineation of the wells crosses an SOC priority area for the pesticide atrazine. (An organic contaminant priority area is a region where greater than 25% of the wells in the area show levels greater than 1% of the primary standard or other health standards.)

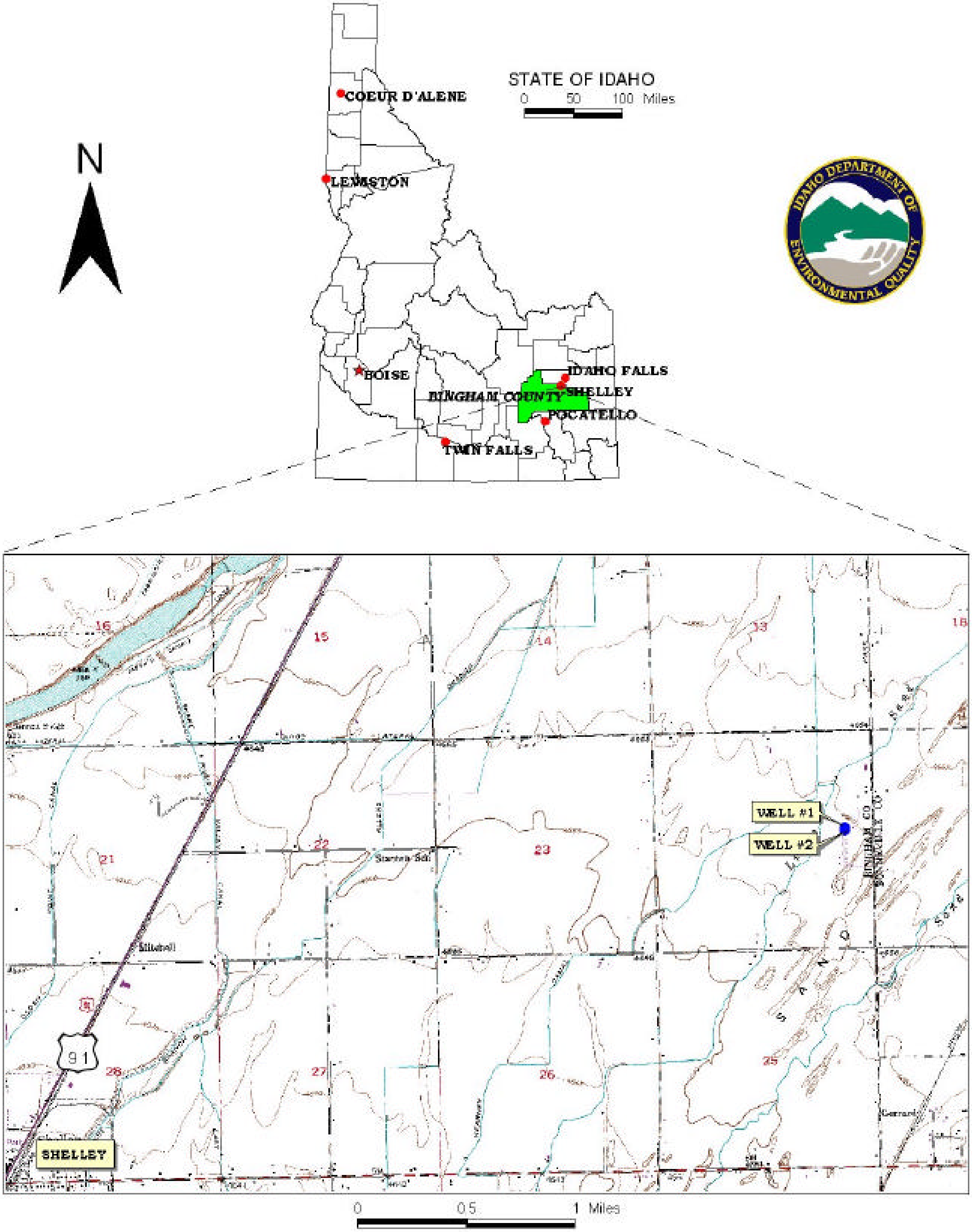
Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a pumping well) for water in the aquifer. DEQ defined the PWS's zones of contribution by using a refined computer model approved by the Source Water Assessment Plan (DEQ, 1999) in determining the 3-year (Zone 1B) and the 6-year (Zone 2) TOT zones for water associated with the "Idaho Falls area of the Eastern Snake River Plain" hydrologic province in the vicinity of the South Park Water and Sewer system. The computer model used site specific data, assimilated by DEQ from a variety of sources including operator records and hydrogeologic reports. A summary of the hydrogeologic information is provided below.

Hydrogeologic Conceptual Model

The ESRP is a northeast trending basin located in southeastern Idaho. The 10,000 square miles of the plain are primarily filled with highly fractured layered Quaternary basalt flows of the Snake River Group, which are intercalated with sedimentary rocks along the margins (Garabedian, 1992, p. 5). Individual basalt flows range from 10 to 50 feet thick, averaging 20 to 25 feet thick (Lindholm, 1996, p. 14). Basalt is thickest in the central part of the eastern plain and thins toward the margins. Whitehead (1992, p. 9) estimates the total thickness of the flows to be as great as 5,000 feet. A thin layer (0 to 100 feet) of windblown and fluvial sediments overlies the basalt. The plain is bounded on the northeast by rocks of the Yellowstone Group (mainly rhyolite) and Idavada Volcanics to the southwest. These rocks may also underlie the plain (Garabedian, 1992, p. 5). Granite of the Idaho batholith borders the plain to the northwest along with sedimentary and metamorphic rocks (Cosgrove et al., 1999, p. 10). The Snake River flows along part of the southern boundary and is the only drainage that leaves the plain. A high degree of connectivity with the regional aquifer system is displayed over much of the river as it passes through the plain. However, some reaches are believed to be perched, such as the Lewisville to Shelley reach. Rivers and streams entering the plain from the south are tributary to the Snake River. With the exception of the Big and Little Wood Rivers, rivers entering from the north vanish into the highly transmissive basalts of the Snake River Plain aquifer.

FIGURE 1. Geographic Location of South Park Water & Sewer



The layered basalts of the Snake River Group host one of the most productive aquifers in the UnitedStates. The aquifer is generally considered unconfined, yet may be confined locally by interbeddedclay and dense unfractured basalt (Whitehead, 1992, p. 26). Whitehead (1992, p. 22) and Lindholm (1996, p.1) report that well yields of 2,000 to 3,000 gallons per minute (gal/min) are common for wells open to less than 100 feet of the aquifer. Transmissivities obtained from test data in the upper 100 to 200 feet of the aquifer range from less than 0.1 square foot per second (ft^2/sec) to 56 ft^2/sec (1.0x104 to 4.8x106 square feet per day (ft^2/day); Garabedian, 1992, p. 11, and Lindholm, 1996, p. 18). Lindholm (1996, p. 18) estimates aquifer thickness to range from100 feet near the plain's margin to thousands of feet near the center of the plain. Aquifer thickness varies from 200 to 3,000 feet in models of the regional aquifer, depending on location.

Regional ground water flow is to the southwest paralleling the basin (Cosgrove et al., 1999; DeSonneville, 1972, p. 78; Garabedian, 1992, p. 48; Lindholm, 1996, p. 23). Reported water table gradients range from 3 to 100 feet per mile (ft/mile) and average 12 ft/mile (Lindholm, 1996, p. 22). Gradients steepen at the plain's margin and at discharge locations. Estimated effective porosities range from 0.04 to 0.25 (Ackerman, 1995, p.1, and Lindholm, 1996, p. 16).

The majority of aquifer recharge results from surface water irrigation activities (incidental recharge), which divert water from the Snake River and its tributaries (Ackerman, 1995, p. 4, and Garabedian, 1992, p. 11). Natural recharge occurs through stream losses, direct precipitation, and tributary basin underflow.

Aquifer discharge occurs primarily as seeps and springs on the northern wall of the Snake River Canyon near Thousand Springs, and near American Falls and Blackfoot. To a lesser degree, discharge also occurs through pumping and underflow (Garabedian, 1992, p. 17).

The Idaho Falls area of the ESRP hydrologic province is located on the northeast margin of the ESRP below the confluence of the Snake and the Henrys Fork rivers. Interpretation of well logs indicates that the basalt and rhyolite of the ESRP is over lain by a 2- to 94-foot-thick layer of sediment. Quaternary basalts are estimated to be 100 to 500 feet thick throughout most of this area (Whitehead, 1992, Plate 3).

Hydraulic conductivity values in the Idaho Falls area are among the highest in the regional aquifer. In a model of the eastern Snake River Plain aquifer, Garabedian (1992, pp. 44-45) used hydraulic conductivity values of 4.4 x 10-2 and 6.1x10-3 feet per second (ft/sec) (3,800 and 527 feet per day (ft/day)) to represent the upper 200 feet of the basalt aquifer in the Idaho Falls area. A value of 7.5 x 10-6 ft/sec (6.5x10-1ft/day) was used to represent rhyolite. Haskett (1972, p. 11) reports that wells constructed in rhyolite to the north of Idaho Falls have productivities close to those constructed in basalt. This suggests that hydraulic conductivity values higher than those used by Garabedian may be representative of the rhyolite aquifer.

There are no known published water table or flow direction maps specific to the Idaho Falls area. However, flow directions are believed to be similar to those depicted at the regional scale (e.g., Garabedian, 1992, Plate 4). Ground water flow direction at the local scale is thought to be highly variable because of preferential flow paths through the fractured and layered basalts. The local flow direction is also likely affected by increased ground water pumping for irrigation west of Idaho Falls (Garabedian, 1992, Plate 9).

Annual average precipitation in the Idaho Falls area is estimated at 10 inches (Kjelstrom, 1995, p. 3). An estimated 2 inches per year (in/yr) enters the aquifer as recharge from precipitation (Garabedian, 1992, p. 20). Garabedian (1992, Plate 8) indicates that the combined areal recharge rate for both irrigation and precipitation is approximately 40 in./yr (0.009 ft/day) in the Idaho Falls area. Seasonal water table fluctuations in excess of 20 feet have been recorded in response to irrigation seepage and canal leakage. Kjelstrom (1995, p. 13) reports river losses of 120,000 acre-feet to the aquifer for the Heise to Lorenzo reach of the Snake River and 280,000 acre-feet for the Lewisville to Shelley reach during the 1980 water year.

River gains of 340,000 acre-feet for the Lorenzo to Lewisville reach are also reported for the same time period. Leakage from the Henrys Fork-Rigby Fan perched aquifer contributes another estimated 588,000 acre feet per year (acre-feet/yr) to the ESRP north of the Idaho Falls area (IDWR, 1997, p 15).

Capture zones for the South Park Water and Sewer wells were delineated using the analytical element model WhAEM 2000 (Kraemer et al., 2000). Application of this refined method resulted in a long, thin, slightly curved corridor extending from the wells north-northeast for approximately 15 miles and then curving more east-northeast ending at the South Fork of the Snake River totaling an area of 3.3 square miles (see Figure 2 in Appendix A). The delineation only includes the 3-year and 6-year TOT zones because the model is based on the assumption that the Snake River fully penetrates the aquifer over the entire length of the delineated reach and that is provides enough water to the aquifer to satify ground water demand. The actual data used in determining the source water assessment delineation area is available from DEQ upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act. Furthermore, these sources have a sufficient likelihood of releasing such contaminants into the environment at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Field surveys conducted by DEQ and reviews of available databases identified potential contaminant sources within the delineated area.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both, to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the <u>potential</u> for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply source.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in December 2002 and January 2003. The first phase involved identifying and documenting potential contaminant sources within the South Park Water and Sewer source water assessment area through the use of Ground Water Under Direct Influence (GWUDI) field surveys and sanitary surveys, computer databases and Geographic Information System (GIS) maps developed by DEQ.

The second, or enhanced, phase of the contaminant inventory involved contacting the operator to identify and add any additional potential sources in the delineated area. This task was undertaken with the assistance of Mr. Bob Morrison. During the enhanced inventory, no additional potential contaminant sources were identified within the delineated source water area by the operator.

An inventory of potential contaminant sources is included in Table 2 in Appendix A. Sources include underground storage tank (UST) sites, aboveground storage tank (AST) sites, automobile repair shops, farms, contractor businesses, gravel pits, grain elevators, dairies, a deep injection well, sites regulated under the Superfund Amendments Reauthorization Act (SARA), a waterwater land application (WLAP) site, Highway 26 and Highway 48, the Union Pacific Railroad, Little Sand Creek, and Willow Creek. The 1995 GWUDI field survey identified sewer lines that run within 200 feet of the wellheads. A map with the well locations, delineated area, and potential contaminant sources is provided with this report (see Figure 2 in Appendix A).

Section 3. Susceptibility Analyses

The wells' susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic sensitivity, system construction, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for the wells is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Appendix B contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors. These factors are surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone (aquitard) above the producing zone of the well. Slowly draining soils such as silt and clay have better filtration capabilities and therefore are typically more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

Hydrologic sensitivity rated high for both wells. This is based upon moderate-to-well-drained soil classes as defined by the National Resource Conservation Service (NRCS), being located within the delineated area. Soils that have poor to moderate drainage characteristics have better filtration capabilities than faster draining soils.

Additionally, the vadose zones of both wells consists primarily of fractured basalt with no soil layers consisting of low permeability units such as clay or silt that would reduce the downward migration of contaminants to the aquifer. According to the well logs, first ground water for Well #1 was found between 92 and 94 feet below ground surface (bgs) and first ground water for Well #2 was found between 84 and 92 feet bgs.

Well Construction

Well construction directly affects the ability of the wells to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

Well #1 was drilled in 1977 to a depth of 197 feet bgs and according to the 2000 sanitary survey (conducted by DEQ) the well was rehabilitated in 1992. The well log or documentation for the rehabilitation was unavailable. The well has a 0.250-inch thick, 12-inch diameter casing set from one foot above ground surface (ags) to 19.6 feet bgs into broken gray basalt. The sanitary survey also indicates that the well casing is at least 18-inches ags. The well log shows that the annular seal extends to 19.6 feet bgs at a layer of broken gray basalt. The casing is not perforated or screened. (Therefore, the location of the highest production level is uncertain). According to the well log, the static water level is found at 65 feet bgs.

Well #2 was drilled in 1975 to a depth of 126 feet bgs and according to the sanitary survey, the well was rehabilitated in 1993. As with Well #1, the well log or documentation for the rehabilitation was unavailable. The well has a 0.250-inch thick, 8-inch diameter casing set from one foot ags to 20 feet bgs into broken brown basalt. The annular seal extends to 20 feet into a layer of broken brown basalt. As with Well #1, the casing is not perforated or screened. (Therefore, the highest production zone of the well is uncertain). The static water level is found at 75 feet bgs.

The system construction rated moderate for Well #1 and high for Well #2 (see Table 1). Both wells are located outside of a 100-year floodplain. The sanitary survey indicates there is no well vent on Well #2. The purpose of the vent is to vent the space between the casing and the column and prevent a vacuum from forming when the pump turns on and draws down the water table. A vacuum could draw in contamination through joints or leaks in the casing or cause the well to slough. The sanitary survey also indicates that both wellheads are properly protected from surface flooding.

The Idaho Department of Water Resources (IDWR) *Well Construction Standards Rules (1993)* require all public water systems to follow DEQ standards. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works (1997)* during construction. Under current standards, all PWS wells are required to have a 50-foot buffer around the wellhead and if the well is designed to yield greater than 50 gpm a minimum of a 6-hour pump test is required. These standards are used to rate the system construction for the well by evaluating items such as condition of wellhead and surface seal, whether the casing and annular space is within consolidated material or 18 feet below the surface, the thickness of the casing, etc. A twelve-inch diameter casing requires a thickness of 0.375 inches and an eight-inch diameter casing requires a thickness of 0.322 inches. If all criteria are not met, the public water source does not meet the IDWR Well Construction Standards. In this case, neither of the South Park Estate wells meet IDWR Construction Standards.

Potential Contaminant Source and Land Use

The wells rated high for IOCs (e.g., nitrates), VOCs (e.g., petroleum products), and SOCs (e.g., pesticides), and rated moderate for microbial contaminants (e.g., bacteria). The predominant irrigated agricultural land use within the delineation of the wells contributed greatly to the potential contaminant inventory/land use scores. Additionally, the majority of the potential contaminant sources surrounding the wells were in the 3-year TOT zone and many of them contained leachable IOCs, VOCs, and SOCs, contributing to the land use scores. (See Table 2 in Appendix A).

Final Susceptibility Ranking

A detection above a drinking water standard MCL, any detection of a VOC or SOC, or a confirmed microbial detection at the wellhead will automatically give a high susceptibility rating to the well, despite the land use of the area, because a pathway for contamination already exists. Additionally, potential contaminant sources within 50 feet of a well will automatically lead to a high susceptibility rating. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0-3 year time of TOT (Zone 1B) contribute greatly to the overall ranking.

Table 1. Summary of South Park Water and Sewer Susceptibility Evaluation

Drinking Water Sources	**Susceptibility Scores[1]**									
	Hydrologic Sensitivity	**Potential Contaminant Inventory and Land Use**				**System Construction**	**Final Susceptibility Ranking**			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	H	H	H	H	M	M	H	H	H	H
Well #2	H	H	H	H	M	H	H	H	H	H

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Susceptibility Summary

In terms of total susceptibility, both wells rated high for IOCs, VOCs, SOCs, and microbial contaminants. Hydrologic sensitivity rated high for both wells and the system construction rated high for Well #2 and moderate for Well #1. The potential contaminant inventory/land use for both wells rated high for IOCs, VOCs, and SOCs, and rated moderate for microbial contaminants. The predominant irrigated agricultural land use of the area contributed greatly to the high potential contaminant inventory/land use scores and to the overall susceptibility of the wells.

Coliform bacteria have been detected in the distribution system from 1994 to 1999. E-coli bacteria were detected in the distribution system on August 26, 1999. Since August 1999, there have been no detections of bacteria in the distribution system. No SOCs or VOCs have been detected in the well water. The IOCs barium, chromium, fluoride, and nitrate have been detected in the water samples but at concentrations below the MCL for each chemical, as established by the EPA. Alpha particles and beta particles (radionuclides) have been detected at minimal levels in the well water samples. Though the chemical detection in the wells has been at low levels, the wells exist in a county with high nitrogen fertilizer use and high herbicide use. Additionally, the delineation of the wells crosses an SOC priority area for the pesticide atrazine. (An organic contaminant priority area is a region where greater than 25% of the wells in the area show levels greater than 1% of the primary standard or other health standards.)

Section 4. Options for Drinking Water Protection

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well or spring sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For South Park Water and Sewer, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey. If microbial contamination becomes a problem, South Park Water and Sewer may need to consider implementing a disinfection system. No potential contaminants should be stored or applied within the 50-foot radius of the wellhead. As land uses within most of the source water assessment areas are outside the direct jurisdiction of South Park Water and Sewer, collaboration and partnerships with state and local agencies and industry groups should be established and are critical to success. Educating homeowners about source water will further assist the system in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include household hazardous waste disposal methods and the importance of water conservation. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Central Bingham County Soil and Water Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Pocatello Regional DEQ Office	(208) 236-6160
State DEQ Office	(208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Ms. Melinda Harper (mlharper@idahoruralwater.com), Idaho Rural Water Association, at (208) 343-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLA – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5 mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RCRA – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

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Appendix A

South Park Water and Sewer
Potential Contaminant Inventory
Figure 2, Table 2

Table 2. South Park Sewer and Water Well #1 and Well #2, Potential Contaminant Inventory

Site #	Source Description[1]	TOT Zone (in years)[2]	Source of Information	Potential Contaminants[3]
1	UST – Closed	0 – 3	Database Search	VOC, SOC
2	UST – Open	0 – 3	Database Search	VOC, SOC
3, 19	UST – Closed; Pumice (Manufacturers)	0 – 3	Database Search	IOC, VOC, SOC
4	UST – Closed	0 – 3	Database Search	VOC, SOC
5	UST – Closed	0 – 3	Database Search	VOC, SOC
6	Grain Elevators	0 – 3	Database Search	IOC, VOC, SOC
7	General Contractors	0 – 3	Database Search	IOC, VOC, SOC
8	Concrete Contractors	0 – 3	Database Search	IOC, VOC, SOC
9	Furniture-repairing & refinishing	0 – 3	Database Search	IOC, VOC, SOC
10, 11	Storage-Household & Commercial; Automobile Body- Repairing & Painting	0 – 3	Database Search	IOC, VOC, SOC
12	Automobile Body- Repairing & Painting	0 – 3	Database Search	IOC, VOC, SOC
13	Furniture-repairing & refinishing	0 – 3	Database Search	IOC, VOC, SOC
14	Tile-Ceramic-Contractors & Dealers	0 – 3	Database Search	IOC, VOC, SOC
15	General Contractors	0 – 3	Database Search	IOC, VOC, SOC
16	General Contractors	0 – 3	Database Search	IOC, VOC, SOC
17	Roofing Contractors	0 – 3	Database Search	VOC, SOC
18	Excavating Contractors	0 – 3	Database Search	IOC, VOC, SOC
20	Tire-Dealers-Retail	0 – 3	Database Search	VOC, SOC
21	Septic Tanks-Cleaning & Repairing	0 – 3	Database Search	IOC, VOC, SOC, Microbials
22	Golf Courses-Public	0 – 3	Database Search	IOC, VOC, SOC, Microbials
23	General Contractors	0 – 3	Database Search	IOC, VOC, SOC
24	Landscape Contractors	0 – 3	Database Search	IOC, SOC, Microbials
25	Steel Erectors	0 – 3	Database Search	IOC, VOC, SOC
26	Automobile Repairing & Service	0 – 3	Database Search	IOC, VOC, SOC
27	Farms	0 – 3	Database Search	IOC, VOC, SOC, Microbials
28	Race Tracks	0 – 3	Database Search	IOC, VOC, SOC
29	General Contractors	0 – 3	Database Search	IOC, VOC, SOC
30	Mine-Pumice	0 – 3	Database Search	IOC, VOC, SOC, Microbials
31	Mine-Sand & Gravel	0 – 3	Database Search	IOC, VOC, SOC, Microbials
32	Deep Injection Well-Active	0 – 3	Database Search	IOC, VOC, SOC, Microbials
33	Deep Injection Well-Active	0 – 3	Database Search	IOC, VOC, SOC, Microbials
34	Group 1Site-Nitrate	0 – 3	Database Search	IOC
35, 49	UST – Open; AST-Gasoline & Diesel	3 – 6	Database Search	VOC, SOC
36	UST – Closed	3 – 6	Database Search	VOC, SOC
37	UST – Open	3 – 6	Database Search	VOC, SOC
38	Dairy <=200 Cows	3 – 6	Database Search	IOC
39	Dairy <=200 Cows	3 – 6	Database Search	IOC
40	Mine-Sand & Gravel	3 – 6	Database Search	IOC, VOC, SOC
41	Mine-Sand & Gravel	3 – 6	Database Search	IOC, VOC, SOC
42	Mine-Sand & Gravel	3 – 6	Database Search	IOC, VOC, SOC
43	Deep Injection Well-Active	3 – 6	Database Search	IOC, VOC, SOC
44	SARA Site-Gas Station	3 – 6	Database Search	IOC, VOC, SOC
45	SARA Site-Telephone Com, Except Radio	3 – 6	Database Search	IOC, VOC, SOC
46	Recharge-Unused	3 – 6	Database Search	IOC, VOC, SOC
47	Recharge-Unused	3 – 6	Database Search	IOC, VOC, SOC
48	Recharge-Unused	3 – 6	Database Search	IOC, VOC, SOC
50	WLAP Site-Potato Processing	3 – 6	Database Search	IOC, VOC, SOC

Site #	Source Description[1]	TOT Zone (in years)[2]	Source of Information	Potential Contaminants[3]
	Little Sand Creek	0 – 3	GIS Map	IOC, VOC, SOC, Microbials
	Union Pacific Railroad	0 – 3	GIS Map	IOC, VOC, SOC, Microbials
	Idaho Canal	0 – 3	GIS Map	IOC, VOC, SOC, Microbials
	Highway 26	3 – 6	GIS Map	IOC, VOC, SOC
	Highway 48	3 – 6	GIS Map	IOC, VOC, SOC
	Willow Creek	3 – 6	GIS Map	IOC, VOC, SOC
	Sewer Line	0 – 3	GWUDI Survey	IOC, Microbials

[1] LUST = leaking underground storage tank, UST = underground storage tank, AST = aboveground storage tank SARA = Superfund Amendments and Reauthorization Act, WLAP = wastewater land application
[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Appendix B

South Park Water and Sewer Susceptibility Analysis Worksheets

Susceptibility Analysis Formulas

Formula for Well Sources

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.22)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

1. System Construction		SCORE			
Drill Date	6/3/77				
Driller Log Available	YES				
Sanitary Survey (if yes, indicate date of last survey)	YES	2000			
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	YES	0			
	Total System Construction Score	4			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	NO	2			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
	Total Hydrologic Score	6			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
	Total Potential Contaminant Source/Land Use Score - Zone 1A	4	2	4	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	29	33	34	12
(Score = # Sources X 2) 8 Points Maximum		8	8	8	8
Sources of Class II or III leacheable contaminants or	YES	33	33	34	
4 Points Maximum		4	4	4	
Zone 1B contains or intercepts a Group 1 Area	YES	0	0	2	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
	Total Potential Contaminant Source / Land Use Score - Zone 1B	16	16	18	12
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Greater Than 50% Irrigated Agricultural Land	2	2	2	
	Potential Contaminant Source / Land Use Score - Zone II	5	5	5	0
Cumulative Potential Contaminant / Land Use Score		25	23	27	14
4. Final Susceptibility Source Score		16	15	16	15
5. Final Well Ranking		High	High	High	High

1. System Construction		SCORE			
Drill Date	9/18/75				
Driller Log Available	YES				
Sanitary Survey (if yes, indicate date of last survey)	YES	2000			
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	NO	1			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		5			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	NO	2			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
Total Hydrologic Score		6			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	29	33	34	12
(Score = # Sources X 2) 8 Points Maximum		8	8	8	8
Sources of Class II or III leacheable contaminants or	YES	33	33	34	
4 Points Maximum		4	4	4	
Zone 1B contains or intercepts a Group 1 Area	YES	0	0	2	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		16	16	18	12
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Greater Than 50% Irrigated Agricultural Land	2	2	2	
Potential Contaminant Source / Land Use Score - Zone II		5	5	5	0
Cumulative Potential Contaminant / Land Use Score		25	23	27	14
4. Final Susceptibility Source Score		17	16	17	16
5. Final Well Ranking		High	High	High	High